

CLAIMS

What is claimed is:

1. A battery monitoring and automatic notification system comprising:
 - one or more batteries;
 - one or more battery charging circuits to maintain each battery in a charged state;
 - a telephone line interface for automatically dialing out a predetermined telephone number over a telephone network;
 - a voice control chip for recording one or more telephone messages and for playing one or more stored telephone messages;
 - one or more circuits to sense battery voltage; and
 - a programmable information processor operatively connected to the telephone line interface, the voice control chip, and the one or more battery voltage sensing circuits.
2. The system of claim 1 wherein the processor is operative to detect when the output voltage of one or more batteries falls below a predetermined level, to actuate the telephone line interface to dial out a stored telephone number, and to actuate the voice control chip to play a stored message.
3. The system of claim 1 wherein the voice control chip has a non-volatile memory for storing one or more telephone messages.
4. The system of claim 1 wherein the voice control chip is operatively connected to a microphone for recording one or more telephone messages.
5. The system of claim 1 wherein the voice control chip is operatively connected to a speaker for playing one or more stored telephone messages.

6. The system of claim 1 wherein the processor has a non-volatile memory for storing one or more telephone numbers.

7. The system of claim 1 further comprising a number keypad, operatively connected to the processor, with push buttons to allow a user to input one or more telephone numbers or messages.

8. The system of claim 7 wherein the number keypad comprises a record push button, a program push button, and push buttons representing the digits 0 through 9.

9. The system of claim 1 wherein one or more of the circuits that monitor battery voltage comprise a voltage divider connected to the processor.

10. The system of claim 1 wherein each battery charging circuit supplies a battery with a variable charging current and provides one of two charging voltages to the battery depending on the level of the charging current.

11. The system of claim 10 wherein each battery charging circuit comprises:
a comparator that compares a voltage corresponding to the charging current with a predetermined reference voltage and that provides two different outputs based on whether the voltage corresponding to the charging current is above or below the predetermined reference voltage;

and a voltage regulator that applies a charging voltage to a battery based on the output of the comparator, applying one charging voltage when the comparator output is low and applying a second charging voltage when the comparator output is high.

12. The system according to claim 11 wherein each battery charging circuit further comprises:

an adjustable current source that reduces the charging voltage of the battery as the temperature of the adjustable current source increases.

13. A combination garage door operator and battery back-up monitoring and automatic notification system, the system comprising:

an electric motor;

a transmission connected to the electric motor to be driven thereby and for connection to a movable barrier to be moved with respect to a barrier frame;

a controller for energizing the electric motor to move the movable barrier, said controller including a back-up battery circuit;

wherein the back-up battery circuit further comprises:

one or more batteries;

a telephone line interface for automatically dialing out a predetermined telephone number over a telephone network;

a voice control chip for recording a telephone message and for playing a stored telephone message;

one or more circuits to sense battery voltage; and

a programmable information processor operatively connected to the telephone line interface, the voice control chip, and the one or more battery voltage sensing circuits.

14. The system of claim 13 wherein the processor is operative to detect when the output voltage of one or more batteries falls below a predetermined level, to actuate the telephone line interface to dial out a stored telephone number, and to actuate the voice control chip to play a stored message.

15. The system of claim 13 wherein the voice control chip has a non-volatile memory for storing one or more telephone messages.

16. The system of claim 13 wherein the voice control chip is connected to a microphone for recording one or more telephone messages.

17. The system of claim 13 wherein the voice control chip is connected to a speaker for playing one or more stored telephone messages.

18. The system of claim 13 wherein the processor has a non-volatile memory to store one or more telephone numbers.

19. The system of claim 13 further comprising a number keypad, operatively connected to the processor, with push buttons to allow a user to input one or more telephone numbers and messages.

20. The system of claim 19 wherein the number keypad comprises a record push button, a program push button, and push buttons representing the digits 0 through 9.

21. The system of claim 13 wherein one or more of the circuits that monitor battery voltage comprise a voltage divider connected to the processor.

22. The system of claim 13 further comprising one or more battery charging circuits to maintain each battery in a charged state wherein each battery charging circuit supplies a battery with a variable charging current and provides one of two charging voltages depending on the level of the charging current.

23. The system of claim 22 wherein each battery circuit comprises:

a comparator that compares a voltage corresponding to the charging current with a predetermined reference voltage and that provides two different outputs based

on whether the voltage corresponding to the charging current is above or below the predetermined reference voltage; and

a voltage regulator that applies a charging voltage to a battery based on the output of the comparator, applying one charging voltage when the comparator output is low and applying a second charging voltage when the comparator output is high.

24. The system according to claim 23 wherein each battery charging circuit further comprises:

an adjustable current source that reduces the charging voltage as the temperature of the adjustable current source increases.

25. A combination garage door operator and battery back-up and recharging system, the system comprising:

an electric motor;

a transmission connected to the electric motor to be driven thereby and for connection to a movable barrier to be moved with respect to a barrier frame; and

a controller for energizing the electric motor to move the movable barrier, said controller including a back-up battery and charging circuit;

wherein the back-up battery and charging circuit supplies a battery with a variable charging current and provides one of two charging voltages to the battery depending on the level of the charging current.

26. The combination according to claim 25 wherein the back-up battery and charging circuit comprises:

a comparator that compares a voltage corresponding to the charging current with a predetermined reference voltage and that provides two different outputs based

on whether the voltage corresponding to the charging current is above or below the predetermined reference voltage; and

a voltage regulator that applies a charging voltage to a battery based on the output of the comparator, applying one charging voltage when the comparator output is low and applying a second charging voltage when the comparator output is high.

27. The combination according to claim 26 wherein the battery back-up and charging circuit further comprises:

an adjustable current source that reduces the charging voltage as the temperature of the adjustable current source increases.

28. A method for monitoring and reporting the condition of a component comprising:

monitoring the condition of the component;

detecting if a defective component condition exists;

initializing a telephone line interface;

dialing a stored telephone number; and

transmitting a stored telephone message.

29. The method of claim 28, further comprising redialing the stored telephone number and re-transmitting the stored telephone message after a predetermined amount of time has elapsed.

30. The method of claim 28, wherein the stored telephone message is a facsimile communication.

31. A method of operating a garage door operator having a battery back-up circuit, the method comprising:

energizing the garage door operator using an external source of AC power, when available, and using back-up batteries when an external source of AC power is not available;

monitoring the condition of one or more back-up batteries;

5

detecting if a low battery voltage condition exists;

initializing a telephone line interface;

dialing a stored telephone number; and

transmitting a stored telephone message.

32. The method of claim 31, further comprising using battery charging circuits to maintain the back-up batteries in a charged state.

10

33. The method of claim 31, further comprising redialing the stored telephone number and re-transmitting the stored telephone message after a predetermined amount of time has elapsed.

34. The method of claim 31 wherein the stored telephone message is a facsimile communication.

15

35. A combination garage door operator and battery back-up monitoring and automatic notification system, the system comprising:

an electric motor;

a transmission connected to the electric motor to be driven thereby and for

20

connection to a movable barrier to be moved with respect to a barrier frame;

a controller for energizing the electric motor to move the movable barrier, said controller including a back-up battery circuit;

wherein the back-up battery circuit further comprises:

one or more batteries;



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